

BODIE ISLAND LIGHT STATION
Cape Hatteras National Seashore
Off Highway 12
Nags Head vicinity
Dare County
North Carolina

HABS No. NC-395

HABS
NC-395

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

HISTORIC AMERICAN BUILDINGS SURVEY
National Park Service
U.S. Department of the Interior
1849 C St. NW
Washington, DC 20240

HISTORIC AMERICAN BUILDINGS SURVEY

BODIE ISLAND LIGHT STATION

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Location: Dare County, Outer Banks of North Carolina; accessible in Cape Hatteras National Seashore via an access road off North Carolina Highway 12. The nearest town is Nags Head, several miles to the north. Oregon Inlet is to the south.

Present Owner: National Park Service, specifically the Cape Hatteras National Seashore headquartered in Manteo, North Carolina. The U.S. Coast Guard retains access to and maintains the functioning optic in the tower.

Present Occupant: National Park Service. The Outer Banks Lighthouse Society and Eastern National operate a small museum and gift shop for the National Park Service in the adjacent keepers' dwelling.

Date: 1871-1872

Present Use: The lighthouse still functions as an active aid to navigation. The keepers' dwelling is a National Park Service Visitor Center. The grounds are accessible to the public and are a popular tourist attraction.

Significance: Bodie Island Light Station served as an important aid to navigation in a system of lighthouses guiding mariners along the hazardous waters of the Outer Banks of North Carolina, often referred to as the "graveyard of the Atlantic." The lighthouses on the Outer Banks guided both national and international shipping plying along the coast. Bodie Island Light, first established in 1848, was the only light between Cape Henry at the mouth of the Chesapeake Bay to the north and Cape Hatteras Light to the south, until the Currituck Light was established to the north in 1875. The current tower, built in 1872, reflects a standardized design used for many first-order lighthouses built by the U.S. Light-House Board. The station and its setting retain a nineteenth century appearance with few modifications. Its original Fresnel lens is still operational, and the station continues as an active aid to navigation and as a popular tourist destination in Cape Hatteras National Seashore.

Project Historian: Candace Clifford, April 2002-November 2002.

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Project Information: The documentation of the Bodie Island Light Station was part of a cooperative project between the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) of the National Park Service and the Cape Hatteras National Seashore, a park unit of the National Park Service. The WASO project leader was Todd Croteau, HAER, Maritime Program Coordinator. Drawings were formatted by Todd Croteau. Large format photographs were provided by Jon A. Buono and James M. Womack. The history was prepared by Candace Clifford. Justine Christianson, HAER Historian, prepared the documentation for transmittal to the Library of Congress. Assistance at the park was provided by Steve Harrison, Chief of Resources, and Doug Stover, Historian.

PART I. HISTORICAL INFORMATION

A. Physical History

1. *Date of construction:* 1871-1872. The superintendent of construction, Dexter Stetson, was instructed to travel to Bodie Island and begin preparations for construction at the site in a letter dated June 19, 1871. Although plans called for the tower to be completed in a year, delays in the receipt of some materials postponed completion until September 1872; the light was first displayed on October 1, 1872.
2. *Design:* The lighthouse was designed by the U.S. Light-House Board. Engineering Secretary, Maj. George H. Elliot signed off on the plans, which were used again for subsequent lighthouse towers, including the tower at St. Augustine, Florida (1874) and at Sand Island, Alabama (1873). Bodie Island Lighthouse is considered to be a 'tall brick tower'; its height is more than 150'.¹ Tall brick towers were first designed in the 1850s to support first-order Fresnel lenses, the most powerful of the seven orders of lenses being introduced by the newly formed U.S. Light-House Board to American lighthouses. In tall towers, the light from these lenses could be seen up to 20 nautical miles offshore. In 1861, the board prepared "Specifications for a First Order Light-House (Brick Tower)."
3. *Original and subsequent owners:* The site for the 1872 tower was a 15-acre tract purchased from John Etheridge and his wife for \$150 by the U.S. Light-House Board on June 13, 1871. In 1945 the site was increased to a little over 55 acres. In 1937 the Cape Hatteras National Seashore was established, and when most of the station was declared surplus by the Coast Guard, the National Park Service expressed an interest in acquiring it. On October 15, 1953, all but a small square plot of land where the tower stood became part of the Cape Hatteras National Seashore. On July 13, 2000, the tower portion was also transferred from the U.S. Coast Guard to the National Park Service with the condition that the Coast Guard retain access to the operational optic.
4. *Builder, contractor, suppliers:* The station was built under the direction of Capt. Peter C. Hains, Lighthouse Engineer for the Fifth Lighthouse District headquartered in Baltimore, Maryland. The onsite supervisor or 'superintendent of construction' was Dexter Stetson, who had also supervised the construction of the 1870 Cape Hatteras Light Station. Construction materials were obtained under contract. Nicholas M. Smith of Baltimore, Maryland, supplied the brick; Andrews & Johnson, also of Baltimore, supplied the dressed granite; McClenahan & Bros, of Port Deposit, Maryland, supplied the

¹Other surviving tall brick towers include Absecon, New Jersey (1857); Barnegat, New Jersey (1857); Fire Island, New York (1858); Dry Tortugas (Loggerhead Key), Florida (1858); Cape Lookout, North Carolina (1859); Cape May Point, New Jersey (1859); Cape Hatteras, North Carolina (1870); Currituck Beach, North Carolina (1875); Morris Island (Charleston), South Carolina (1876); and Ponce de Leon, Florida (1887).

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foundation granite; and Paulding, Kemble & Co. of West Point Foundry, in Cold Spring, New York, supplied the ironwork, much of which originated at the Phoenix Iron Works. The first-order lens was manufactured by Barbier & Fenestre of Paris, France. Many of the materials were delivered on the Lighthouse Tender TULIP.

5. *Original plans and construction:* There are twenty-four plates for the construction of the tower at Bodie Island, which were prepared by the U.S. Light-House Board in 1871. A description of the tower's physical construction can be found in Section B, Part 6.

6. *Alterations and additions:* Aside from some adjustments to the original plans and ongoing repairs, no significant alterations or modifications have been made to the tower during its first one-and-a-quarter century of service. Windows and hardware have been replaced and surfaces have been repeatedly painted as part of ongoing maintenance to keep the structure a functioning lighthouse. Although major repairs are needed to restore the corroded and worn metal work, the tower is remarkably intact with its original lens still in place and operational.

B. Historical Context:²

The current lighthouse on Bodie Island is the third tower constructed to mark that section of the Outer Banks. Originally called Body's Island Light, the first tower on the island was a 54' brick structure completed in 1847 and lit in 1848. Built on a brick foundation, the first tower soon began to settle and by 1858 was beyond repair. A second brick tower, 80' in height, was completed in 1859; however, it was destroyed by Confederate troops during the Civil War. In 1872 the third and current tower on Bodie Island was completed and lit. Rising 164' above the ground, this tower is one of the tall tower types first built in the 1850s to support powerful first-order Fresnel lenses. All three towers at Bodie share a similar design above their foundations in being stand-alone conical towers, the most common lighthouse type. As of 2002 the station at Bodie Island continues as an active aid to navigation and a popular tourist destination.

1. *The Need for a Lighthouse on Bodie Island*

The Outer Banks of North Carolina refer to barrier islands separated from the mainland by a vast body of shallow water that makes up the Albemarle, Croton and Pamlico Sounds. Exposed to the repetitive action of the sea, the Outer Banks are constantly shifting, the shoreline wearing away in some places while being built up in others. Over time, inlets have formed between the Atlantic and the inland

²This section is primarily based on a publication by Francis R. Holland, Jr., *A History of Bodie Island Light Station* (U.S. Department of Interior, National Park Service, Division of History, February 1, 1967). Many sections of Holland's report have been excerpted directly or paraphrased.

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sounds and are constantly moving. Dangerous shoals and reefs have also formed offshore, posing dangerous hazards to navigation. In addition, the warm Gulf Stream meets the cold Labrador Current offshore creating a turbulence threatening to many vessels.

As the Gulf Stream provided a trade route for ships bound for Europe or coasting up and down the East Coast, the number of shipwrecks off the Outer Banks increased as the country grew economically. The great numbers of lost lives and cargo prompted the area along the Outer Banks to be known as the "graveyard of the Atlantic." In an effort to protect mariners and their cargo, lighthouses were established at Cape Hatteras and Ocracoke (Shell Castle) by 1803. A lighthouse at Cape Lookout followed in 1812. The southern portion of the Outer Banks was fairly well lit, but the northern portion between Cape Hatteras and Cape Henry at the entrance to the Chesapeake Bay was still dark, leading one observer to report that Bodie Island was "literally covered with wrecks."³

In February 1837, "Congress directed the Secretary of the Treasury to have the coast south of Chesapeake Bay examined with an eye toward establishing lighthouses and other aids to navigation."⁴ Lt. Napoleon L. Coste, commanding officer of the revenue cutter CAMPBELL, conducted a meticulous examination of the coast from Key West northward and made numerous recommendations for the placement of lighthouses, lightships, and beacons. He considered Bodie Island to be "of great importance," saying, "more vessels are lost there than on any part of our coast. It is the eastern-most point of land on the coast of North Carolina, forming in fact, a cape. It is my opinion, that by the erection of a lighthouse on it, much property would be saved, and the navigation of the coast facilitated."⁵

2. Obtaining the Site for the First Lighthouse at Bodie Island

On March 3, 1837, Congress passed an act that included appropriations for a large number of lighthouses, including \$5,000 for a lighthouse on Pea Island, just south of Bodie Island, near New Inlet. At that time a narrow run (perhaps the beginning of Oregon Inlet) separated Pea Island from Bodie Island. From there, Pea Island extended down to New Inlet, which was probably located in the vicinity of Jack Shoal. Capt. Charles Skinner, who had been assigned to examine the site at Pea Island, and the local collector of customs at Washington, North Carolina, Thomas H. Blount, believed that the principal victims of this section of the Outer Banks were "vessels coming from the north, who want a

³House Doc. No. 41 (Serial # 322), 25th Cong., 2^d sess., p. 60; House Ex. Doc. No. 24 (Serial # 345), 25th Cong., 3^d sess., p. 113; found in Holland, p. 3.

⁴Holland, p. 16.

⁵American State Papers, Commerce and Navigation, Class IV, V.2, 11th-17th Congress, 1814-1823 (Washington, 1834), 521; House Document No. 21 (Serial # 322), 25th Cong., 2^d sess., p. 1-6; found in Holland, p. 17.

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point of departure to shape a course to clear Hatteras, which they desire to pass as close as possible, to keep out of the Gulf stream; the beach is so low, they run on it before they are aware of danger." Vessels from the south were little endangered, Skinner added, since they "make Hatteras, and steer along in the Gulf Stream, which sweeps them off the land." From these conclusions, the two came up with different recommendations for the site of the lighthouse. Collector Blount recommended that the lighthouse be located on Pea Island near New Inlet where it would be "secure from the storms... and much more comfortable to the keeper." Skinner, on the other hand, recommended the lighthouse be placed on Bodie Island because the location "is farther from Hatteras, and is nearer the ocean, not being more than half a mile distant, whereas Pea Island is within the sound about one and a half miles, and, in fact, is but the southwest part of the island." He argued that the vast majority of the vessels came from the north and would be better served by a light situated on Bodie Island. Moreover, the naval officer added, the land would be much cheaper and it would be easier to get construction materials to Bodie Island rather than to Pea Island. For the lighthouse he recommended erecting "a tower, sixty feet high, with a good revolving light...; revolving, because Hatteras, the nearest south, is fixed, and Cape Henry, the nearest north, is also fixed."⁶

On July 7, 1838, Congress reappropriated \$5,000 for a lighthouse to be built on either Pea Island or Bodie Island, leaving the decision to the Fifth Auditor, Stephen Pleasonton, who was the administrator of the Lighthouse Service from 1820 to 1852. Following Skinner's recommendation, Pleasonton instructed Collector Blount to purchase a site on Bodie Island. Pleasonton told Blount to select the site he thought best because Captain Skinner did not specify a site. It is evident from Skinner's reports, however, that he did have a specific site in mind and at some time communicated that intelligence to Pleasonton in their correspondences. Pleasonton, apparently, had forgotten about it at the time. According to Pleasonton, furthermore, Skinner had dug down 2' for a foundation, which he found to be "good stiff clay."⁷

The purchase of a site for the lighthouse was not a simple matter. Captain Skinner thought that 4 acres, which the owner was willing to sell for \$100, would be adequate for a light tower, dwelling, and vegetable garden. By the time negotiations were underway in April 1839, the owner, John Midgett, had died intestate, leaving fifteen heirs to the land. Collector Blount acquiesced to the heirs' asking price of \$50 an acre but was unable to secure a clear title; four of the heirs were minors and their guardian, Samuel Mann, could not dispose of the land for them without an act of the North Carolina legislature. By December 1840, the state legislature authorized Mann to sell the minors' interest in the

⁶Holland, pp. 18-19.

⁷House Document, No. 146 (Serial #484), 29th Cong., 1st sess., p.1-2; S. Pleasonton to Thomas H. Blount, June 12, 1847, Lighthouse Letters, Fifth Auditors' Office, March 2 to July 24, 1847; found in Holland, pp. 19-20.

site. A year and a half passed before Blount finally had all the necessary signatures and the deed recorded. In July 1842, Pleasanton forwarded the deed to the Attorney General for review.⁸

In January 1843, Collector Blount, concerned about the delays in building the station at Bodie Island, appealed to a member of Congress.

... I presume the reason why it has not been commenced is that the appropriation was insufficient and will require one of the first class [lights]. There is no part of the Coast of the U.S. which requires a Light House more than Body's Island—'tis' in the direct route of all going North or South & of all foreign vessel bound into the Chesapeake, & when there during the last summer, there were fifteen wrecks in sight at one place, & within the last month, a Brig bound into Norfolk was wrecked there worth more than would have built the light house.

You will excuse my calling your attention to this subject, but many of your constituents have suffered and will continue to do so unless a light is placed there, & not only yours but the north are, from their owning more shipping than the south, still more interested.⁹

It took until 1846, when, after some prodding from the Fifth Auditor, the Attorney General ruled the deed valid.

3. Construction of the First Lighthouse at Bodie Island

The original \$5,000 was not enough to construct a first-order lighthouse on Bodie Island, so in 1847 Congress appropriated \$12,000. Meanwhile, in 1846, a new inlet had formed at Bodie Island and was named Oregon Inlet for the small steamboat OREGON that had passed through it.¹⁰ Pleasanton considered constructing a cast-iron tower for the site because it could be disassembled and moved. After assurances from the local collector that there was no danger of shoreline erosion, Pleasanton opted for a brick tower.¹¹

⁸Holland, p. 20.

⁹Correspondence from Thos. H. Blount to Hon. Ed Stanly, U.S. Representative, dated January 20, 1843; found in National Archives (Washington, D.C.), Entry 17C, "Letters Received from Superintendent of Lights, 1803-52."

¹⁰House Ex. Doc. No. 13 (Serial # 540), 30th Cong., 2^d sess., p. 43; found in Holland, p. 21.

¹¹S. Pleasanton to James K. Hatton, March 10, 1847, and Pleasanton to Hatton, April 9, 1847, Lighthouse Letters, Fifth Auditor's Office, March 2 - July 24, 1847, National Archives; found in Holland, pp. 21-22.

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Four bids were received for constructing the tower. Thos. Lewis & Co. had the highest bid of \$10,200, followed by \$9,800 from C.L. Coltman. The next lowest bid was \$9,487 from C.B. Clusky. All three contractors were from Washington, D.C. The contract was awarded to the lowest bidder, Francis A. Gibbons of Baltimore, who bid \$8,750.¹² Gibbons, along with his partner Francis X. Kelly, would later build the first eight lighthouses on the West Coast. The former collector of customs at Washington, North Carolina, Thomas H. Blount, was selected to oversee the construction.

The lighthouse was to support a revolving light that would distinguish it from the fixed light at nearby Cape Hatteras. The specified lighting apparatus was fourteen Argand lamps with fourteen 21" reflectors. Pleasonton solicited bids for fitting up the tower, including the lighting apparatus, from two firms: Winslow Lewis and Hooper & Co., both of Boston. Hooper decided not to bid, and Lewis was awarded the contract for \$2,350.¹³ Lewis' proposal was as follows:

I will fit up the light house to be built at Boddy's Island N.C. with 14 cast brass lamps fitted with the perfect patent screw caps & 14.21 inch reflectors placed on two sides of an oblong sliding chandelier, heavy brass bows for the lamps & reflectors. One of Willards extra sized clocks, pulleys & line. A round iron box 9 inches diameter, 2 1/2 feet long for the weight to run down in the centre tube 100 lb iron shot. Furnish two spare lamps, 42 spare patent perfect screw caps, 42 spare inside tubes, 8 double tine oil canisters to hold 90 gallons each, 1 lantern canister & iron trivet, 1 tin wick box, 1 tin tube box, 1.3 gallon oil carrier, 1/2 gall. oil feeder, hand lantern & lamp, 2 pr. scissors, wick trimmer, 6 wick formers, 1 pr. cutting nippers, 1 pr. plyers, 1 lb. Rouge.

The whole to be done in the best manner as soon after information is received that the lighthouse is ready for the apparatus as they can be sent out with competent men to put it up, for the sum of twenty three hundred fifty dollars.¹⁴

The tower was completed in September 1847. Towards the end of September, Samuel Tillitt received his appointment as keeper at an annual salary of \$400. Winslow Lewis installed the lamps by mid-October but lighting was delayed for want of lamp equipment such as tube glass and wicks. It is not

¹²National Archives, Record Group 26, Entry 17C.

¹³S. Pleasonton to Wm. A. Wellman, April 28, 1847; S. Pleasonton to Robert J. Walker, May 20, 1847 and S. Pleasonton to Marcus Morton, May 25, 1847, Lighthouse Letters, Fifth Auditor's Office, March 2-July 24, 1847; found in Holland, pp. 22-23.

¹⁴National Archives, Record Group 26, Entry 17C.

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known when the light was first displayed, but it was sometime between January 22, 1848 and March 13, 1848.¹⁵

On March 13, 1848, Collector Hatton reported:

I have but recently returned from Boddys Island, and beg leave to report this light most favorably. There is not in my opinion a better light of the same size, tower and apparatus to be found anywhere. I have arranged the clock to make a revolution of the lampframe once every six minutes, showing a full light every three minutes at a given point—thus making a difference of one minute between this and Ocracoke light, the latter giving a full light every two minutes....¹⁶

Hatton also indicated the need for an oil house and a boat for carrying wood, "there being no growth on this Island, or none nearer than 12 miles makes it an arduous task to procure wood...."¹⁷

According to Francis R. Holland,

The finished station consisted of a brick tower, an unpainted wood single dwelling, a 2,000 gallon brick cistern and two outhouses. The tower, 54 feet tall, looked much like an upside down ice cream cone with about one-third of its small end cut off. Its exterior base diameter was 17 feet, and at the top the cone measured approximately 12 1/2 feet across. It was painted white, had three windows, and was crowned by a lantern 10 feet in diameter. The eight sides of the lantern were glazed with panes 22" x 28" in size and 3/16" in thickness. No doubt, in keeping with the times, the astragals were quite wide. Inside the lantern were 14 Argand lamps, each having a 21-inch parabolic reflector—the best light then in general use in the United States lighthouses. The lamps rested on a chandelier in the center of the lantern and the flashing effect was achieved by rotating the chandelier. A falling weight caused the rotation. Gears and fly-wheels, called a clockwork system because it was similar to the mechanism of a

¹⁵S. Pleasonton to Winslow Lewis, Aug. 28, 1847; S. Pleasonton to James K. Hatton, October 21, 1847; S. Pleasonton to Secretary of the Treasury, Dec. 16, 1847; all in Lighthouse Letters, Fifth Auditor's Office, July 24, 1847 to Jan. 11, 1848. S. Pleasonton to George W. Blunt, Feb. 11, 1848; S. Pleasonton to James K. Hatton, June 29, 1848; both in Lighthouse Letters, Fifth Auditor's Office, Jan. 12, 1848 to Aug. 1, 1848; found in Holland, p. 26. Holland extends the period of when the light might have been lit until June 29, 1848. The author of this report found a letter dated March 13, 1848, from Collector Hatton, indicating the light was lit by that date; National Archives, Record Group 26, Entry 17C.

¹⁶Correspondence to Stephen Pleasonton, National Archives, Record Group 26, Entry 17C.

¹⁷Correspondence to Stephen Pleasonton.

grandfather clock, controlled the speed of rotation of the chandelier, and concomitantly the rapidity of the descent of the weight. The dwelling was a five room, wood shingled, 1 1/2 story building. The overall exterior dimensions of the structure were 35' x 20'.¹⁸

A reply to a circular issued by the Secretary of the Light-House Board on July 15, 1851, indicated that the height of the tower from its base to the center of the lantern was 48' with a focal plane of 50'. The tower windows and door had granite sills and lintels with iron sashes. An iron spiral staircase led to an iron-frame octagonal lantern with a copper dome. The height of the lantern was 8'-5" inches and the width was 9'-8". The apparatus had been thoroughly repaired in October 1851. The brick tower was plastered with cement and whitewashed both inside and out. The station was located a half mile from the sea. Keeper Etheridge had been in charge of the station since July 2, 1849. The report also stated that 398 barrels of oil, thirty-four dozen wicks, 173 chimneys, one and a quarter buffskins, 33 yards of cotton cloth, one box of cleaning powder, one pair of scissors, and one box of soap were consumed during the year ending June 30, 1851.¹⁹

4. Demise of the First Lighthouse at Bodie Island

Within two years of completion, the brick foundation, "which it was supposed if the tower settled at all, would make it settle evenly," began to sink unevenly. The tower was found to be 1' out of plum, "canted to eastward," and the collector was at a loss as to what to do. Pleasanton suggested that he employ "an experienced mechanic to examine the tower and devise a plan of straightening it." He added, "perhaps it can be done by digging the ground away from the highest side of the foundation, so as to let the tower settle on that side equal to the other." At any rate Pleasanton was anxious that the tower be fixed and authorized any cost necessary for the repair work.²⁰ The cost of repair was estimated at \$1,490.²¹ It was soon apparent that the lighting apparatus had been thrown out of kilter and also had to be repaired.

¹⁸S. Pleasanton to Secretary of the Treasury, Dec. 16, 1847 to Jan. 11, 1848; S. Pleasanton to James K. Hatton, July 9, 1849; in Lighthouse Letters, Fifth Auditor's Office, May 14, 1849 to June 25, 1850; "Description of the Lighthouses, 5th District, 1858." The description of the lantern is as it was in 1858, but since the pane sizes were the same in 1858 as they were when the lighthouse was built, it would appear that the lantern in 1858 was the original one. See Holland, pp. 26-27.

¹⁹National Archives, Record Group 26, Entry 17C.

²⁰S. Pleasanton to R.H.J. Blount, Aug. 28, 1850, Lighthouse Letters, Fifth Auditor's Office, Jan. 25, 1850 to Feb. 18, 1851; *House Ex. Dec. No. 14* (Serial # 598), 31st Cong., 2^d sess.; found in Holland, pp. 28-29.

²¹R.H.J. Blount to S. Pleasanton, Oct 16, 1850, National Archives, Record Group 26, Entry 17C.

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In 1851 Congress appointed a special board to investigate the condition and operation of the Lighthouse Establishment. The resulting report indicated the following about the condition of Bodie Island Light Station:

The Body's Island light is badly located, and insufficient in power and range to serve fully the requirements of commerce and navigation. Vessels bound south from the eastward to run to make this coast, with the view to avoid the opposing currents of the Gulf-stream, and at the same time to avail of the favorable currents within the limits of the cold wall bounding the Gulf-stream.

The trend of the coasts on either side of the Chesapeake Bay renders navigation more dangerous than it would otherwise be, and therefore it becomes the more important to light well the entire coast from Cape Hatteras to Cape Henlopen [Delaware].

It is of great importance especially to the coasting trade, and would be of much more, if it were increased to a first-class light... This [light], in addition to the proposed seacoast light between it and Cape Henry, would, if properly fitted, save the life of many a gallant seaman, and millions of dollars worth of property to the country.²²

The U.S. Light-House Board, created to administer the Lighthouse Service in 1852, was strongly committed to using the superior Fresnel apparatus for lighting United States lighthouses. In 1854, Fresnel lenses were installed in the lighthouses at Cape Hatteras, Ocracoke, and Bodie Island. A first-order lens was placed in the Cape Hatteras Lighthouse, but only fourth-order lenses were installed at Ocracoke and Bodie Island. The Bodie Island lens exhibited a fixed white light, varied by red and white flashes.²³ This effect was achieved by a red shield that rotated slowly around the outside of the lens, and at regular intervals it would cover the emission of the lens, thus changing the light to red.

The decision to install a fourth-order lens at Bodie was evidently determined by the size of the lantern. To place a third-order lens, roughly equivalent in intensity to Argand lamps with 21" reflectors, would have necessitated setting a larger lantern on the tower, and the tower in all probability could not have supported its weight. That the old lantern was retained seems borne out by the fact that in 1855,

²²House Ex Doc. No. 28 (Serial # 617), 32^d Cong., 1st sess., pp. 137-138; found in Holland, pp. 29-30.

²³House Ex Doc. No. 3 (Serial # 780), 32^d Cong., 2^d sess., pp. 288, 318; Holland, pp. 30-31.

several years after installation of the lens, the lantern was completely re-glazed with 22" x 28" panes, the same size used when several panes were replaced in 1850.²⁴

5. *The Second Lighthouse Tower at Bodie Island*

By 1858 the tower with its poor foundation was beyond repair, and the Light-House Board decided to build a new tower. At the same time they decided to upgrade the light and provide for the installation of a third-order Fresnel apparatus. An appropriation of \$25,000 was requested and received. The new tower was completed quickly, and it was lit for the first time on July 1, 1859. After the lighting of the new tower, the old tower was razed.²⁵

Correcting the defective foundation of the old tower, the new tower rested on a pile foundation.

Workers drove seventy piles vertically into the ground and on top of them they laid a stone foundation. Upon this foundation the masons erected a brick tower rising 80 feet into the air. Crowning the tower was the lantern containing a third order lens. When completed the focal plane of the light was 86 feet above the ground and 90 feet above sea level. The lens revolved, flashing every 90 seconds, and a mariner could see the light under normal conditions for a distance of 15 miles. The tower was painted white.²⁶

The keeper's dwelling underwent repairs, and a dwelling was constructed for the new assistant keeper, since third-order lights generally required two people for operation.

During the Civil War, Bodie Island Lighthouse was used as a lookout tower and storage place for guns. Fort Oregon had been constructed about three-quarters of a mile from the lighthouse at Oregon Inlet. Forts were also built near Cape Hatteras and Ocracoke Lighthouses. The forts along the Outer Banks

²⁴S. Pleasonton to James K. Hatton, July 9, 1849, Lighthouse Letters, Fifth Auditor's Office, May 14, 1849 to Jan. 25, 1850; and Letters to Inspector, 5th District, Dec. 18, 1852 to July 30, 1860, p. 144; found in Holland, p. 31.

²⁵*Estimates of Appropriation for 1858 (Serial #909)*, 34th Cong., 3^d sess., p. 40; *Sen. Ex. Doc. No. 3 (Serial # 1027)*, 36th Cong., 1st sess., p. 294; L. Sitgreaves to W.B. Franklin, Baltimore, July 1, 1859, 5th Dist. Engineer Letter Press, 1857-1864; found in Holland, p. 32.

²⁶L. Sitgreaves to W.B. Franklin, Baltimore, Oct. 1, 1858, 5th Dist. Engineer Letter Press, 1857-1864; U.S. Light-House Board, *List of Lighthouses Lighted Beacons, and Floating Lights of the Atlantic, Gulf and Pacific Coasts of the United States* (Washington: G.W. Bowman, 1861), pp. 44-45. Work on the new lighthouse apparently began around Sept. 1, 1858, and the structure was completed on May 14, 1859. Certain vicissitudes accompanied the work. Shortly after the work began a vessel carrying brick for the tower was lost, and in October a storm closed Oregon Inlet so that it became necessary to enter the sound via Hatteras Inlet and then lighter the construction material to the Bodie Island site, some forty miles away; found in Holland, pp. 32-33.

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were meant "to guard the inlets and thus protect the sounds from Yankee incursions."²⁷ After a two-day battle in the latter part of August 1861, Forts Hatteras and Clark fell to federal forces. Soon the Confederates abandoned the forts at Ocracoke and Oregon Inlets. The rebel commanders moved all troops, supplies, ammunition, and material from Fort Oregon to Roanoke Island.²⁸ Before leaving, the Confederates blew up the tower at Bodie Island; possibly because they believed it could be used as a lookout by the Union troops. Light-House Board records indicate that the lens was saved and eventually shipped to the Lighthouse Inspector in New York.²⁹

In November 1861, the site was observed by the District Lighthouse Engineer at a distance of one mile as his ship passed the site. He found the tower in ruins, but the dwelling seemed to be undamaged. Feeling sure that damage could not have extended below the plinth line of the tower because of its tremendously strong foundation, he was certain the tower could be restored in a few months and put back in operation. The U.S. Light-House Board, however, felt that relighting nearby Cape Hatteras Lighthouse was all that was required until the war was over.³⁰

6. Construction of the Third Tower at Bodie Island

The first appropriation in 1870 mentioned a lighthouse on Paul Gamiel's Hill situated near Kitty Hawk some 15 to 20 miles to the north of the former Bodie Island Lighthouse site. The hill site was eventually eliminated in favor of the former Bodie Island location, probably because a lighthouse was planned for nearby Currituck Beach to the north.³¹

²⁷Holland, p. 34.

²⁸Holland, pp. 34-35.

²⁹*Official Records, War of the Rebellion, Navies, Series 1, v. 6* (Washington, 1897), pp. 80, 270, 790, 792; J.T. Scharf, *History of the Confederate States Navy* (Albany, 1894), p. 378; John G. Barrett, *The Civil War in North Carolina* (Chapel Hill: University of North Carolina, ca. 1963), pp. 46-47; Subject Index Slips to Light-House Board Records, Bodie Island, Aug. 25 and 28, 1862; *House Ex. Doc. No. 22* (Serial # 1165), 37th Cong., 3rd sess., p. 259; Walter S. Sanderlin, *The Great National Project, A History of the C&O Canal* (Baltimore, 1946); found in Holland, p. 35.

³⁰Holland, p. 35.

³¹U.S. Light-House Board Journal, May 3, 1867 to May 29, 1869, p. 133; Subject Index Cards to Incoming Letters, Bodie Island, Oct. 9, 1867 and Nov. 19, 1869; Annual Report of W.J. Newman, District Engineer, dated Sept. 20, 1867, 5th Dist. Engineer Letter Press, May-Nov. 1870; *Annual Report, 1870*, pp. 35-36; Clipping File, Bodie's Island, National Archives, Record Group 26. "An act making appropriations for sundry Civil Expenses of the Government for the year ending June thirty, eighteen hundred and seventy-one, and for other purposes." Light-House Board, *Annual Report, 1869* (Washington, 1869), p. 46; Site File, Bodie Island, Light-House Board, *Annual Report, 1871* (Washington, 1871), pp. 31-32; David Stick, *The Outer Banks of North Carolina* (Chapel Hill, 1958), p.

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Since Oregon Inlet had moved to within 400 yards of the site of the original Bodie Island towers, the board decided to select a site to the north on the opposite side of the inlet.

The new site is 1 1/2 nautical miles north of Oregon Inlet, 3/4 mile from the Atlantic and 3/8 mile from Roanoke Sound. It is protected on the west by Roanoke Island from the action of storms tending to drive the waters of Pamlico Sound towards the sea. It is a square piece of land 15 acres in extent, and was purchased of John B. Etheridge and wife, June 13, 1871, for \$150. The character of the soil is sandy and unfit for cultivation, but by covering it with marsh mud some slight crops could be raised.³²

John Etheridge, an early keeper of the first Bodie Island Lighthouse, had laid claim to 240 acres of vacant land belonging to the state, and on June 28, 1860, the state conveyed the land to him by grant.

He was quite willing to let the Lighthouse Board have a portion of it, and accordingly made arrangements to sell them fifteen acres. Fifteen acres were selected, and the Lighthouse Board proceeded to get the North Carolina legislature to pass a bill authorizing Federal purchase of the site. The necessity of getting the State's permission plus a delay while the United States District Attorney in Salem ascertained Etheridge's title held up construction for nearly six months. But in time the title was confirmed and the Federal Government went ahead with the acquisition of the site. Then in the latter part of May, 1871, the Lighthouse Engineer of the 5th District ran a survey and found a portion of the fifteen acres outside Etheridge's grant. The District Engineer moved the site northward where it was "undoubtedly on Etheridge's grant," and on June 13, 1871, John Etheridge and his wife Fanny conveyed fifteen acres of land to the Lighthouse Board, for which they received \$150.00.³³

263; found in Holland, pp. 36-37.

³²Description of "New structure at Body's Island" in National Archives, Record Group 26, Entry 66, "Site Description Files."

³³J.H. Simpson to W.B. Shubrick, Nov. 4, 1870, 5th Dist. Engineer Letter Press, May to Nov., 1870; Light-House Board, *Annual Report, 1871* (Washington, 1871), p. 32; Peter Hains to W.B. Shubrick, March 27, 1871, 5th Dist. Engineer Letter Book, Nov. 1870 - May 1871; Peter A. Hains to W.B. Shubrick, May 27, 1871, 5th Dist. Engineer Letter Book, April - Sept. 1871; Peter A. Hains to Secretary of State, North Carolina, Jan. 24, 1871, 5th Dist. Engineer Letter Press, Nov. 1870 to May 1871; Peter A. Hains to D.H. Starbuck, March 8, 1871, 5th Dist. Engineer Letter Book, Nov. 1870 to May 1871; D. H. Starbuck to Peter C. Hains, Salem, N.C., March 24, 1871, Site File Bodie Island; Light-House Board Meeting of Sept. 5, 1870, Light-House Board Journal, June 7, 1869 - March 25, 1874; Appendix D, "Questionnaire covering Real Estate Owned by the United States," Nov. 17, 1929, Site File, Bodie Island, says that the site of the lighthouse "Does not revert to the original owners if the Government vacates." At that time the federal government had concurrent jurisdiction; found in Holland pp. 37-38.

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On June 19, 1871, Capt. Peter C. Hains, Lighthouse Engineer for the Fifth Lighthouse District provided the following instructions to Dexter Stetson, Superintendent of Construction for Bodie Island Light Station.

You will proceed without delay to Body's Island, N.C., and commence the construction of the First Order Light house at that place in accordance with the drawings and instructions furnished you. Capt. Wyatt with the Sch. *Roanoke* will be at your disposal for the purpose of conveying your party to Hatteras, and then to Body's Island, immediately after which you will discharge him.

You will take down the temporary buildings at Hatteras and send them to Body's Island—there to be used for storehouses and quarters for your men. For the purpose of landing supplies with facility you will build a temporary wharf on piles and of other cheap materials into Roanoke Sound from a point on shore convenient to the Light house . . . You will exercise your own judgment in carrying out the details of the wharf, bearing in mind that it is necessary not to expend any large am't on such a work. The arrangement for landing supplies and store room for 1,000 bbls. of cement must be completed with as little delay as practicable. The L.H. at Body's Island, the construction of which is placed in your charge, will be one of the most important on the Atlantic Coast and too much energy cannot be displayed in hastening its completion.

As the work you superintended at Cape Hatteras has rendered you familiar with the details and requirements of such a tower, as that to be built at Body's Island, detailed instructions are not deemed necessary, the drawings being sufficiently explicit with general instructions. The foundation will be on grillage similar to that at Cape Hatteras tower—the top of the grillage being six feet two inches below the surface of the ground. All the foundation, stone & brick work will be laid in Portland Cement—the mortar being made of three parts sand to one of cement. With these general instructions you are expected to push the work along with the greatest practical dispatch. Any points of doubt that may arise in your mind you will submit with the least delay to this office for decision. The Light house Board expects this tower to be completed in one year.³⁴

Rather than letting the work out to contractors, the Light-House Board decided to undertake the actual construction. The board put an emphasis on quality of materials and workmanship rather than on cost. This was quite a departure from the frugal approach of the earlier lighthouse administration.

A working party was dispatched to Bodie Island in June 1871 under the supervision of Dexter Stetson. They erected the storage buildings, quarters, wharf and tramway used in the construction of the Cape

³⁴National Archives, Record Group 26, Entry 3 (NC-63), "Records of the Fifth Light-House District (Baltimore), 1851-1912."

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Hatteras Light Station, completed the previous year. The foundation of the Bodie Island tower was completed first. Before starting the foundation, borings were made with an artesian-well apparatus to test the underlying strata. The first 22' consisted of "sharp compact sand, light in color with dark specks." The next 6' was "coarse sand and gravel mixed with shell." The next 8' after that was found to be "fine dark sand mixed with a small quantity of soft alluvium." The subsequent 10' was "coarse sand again," and the final 14' was "fine dark sand."³⁵ Based on these findings, it was decided that a pile foundation was unnecessary.

The Light-House Board described the foundation as follows:

... The foundation of the tower rests upon a grillage of timbers similar to that employed at Cape Hatteras, viz: two courses of 6" X 12" timber, securely fasted by treenails together laid at right angles on a course of 3" plank. This grillage was laid at 7 feet below the surface and as it was at least four feet under water, it will not decay. To put in the foundation it was necessary to enclose a space, large enough for the purpose, with a cofferdam and pump out the water. On excavating, the soil inside the cofferdam was found to be light-colored sand to a depth of 3 ft., then one foot of decayed vegetable matter assembling peat, and below this a fine dark blue sharp sand. On examination, by borings, of 10 ft. below the bottom of the dam showed no apparent change in the character of the soil.

On the grillage is placed a course of granite dimension stone in large blocks 18" in thickness; on this is laid rubble in courses, using blocks from 1 to 5 tons in weight, as large as could be handled by the derrick. Each course was carefully grouted with hydraulic Portland cement, one part of cement being used to two of sharp sand. It was the intention at first to lay four courses of granite like the lower course, hewn out roughly, but, as it could not be had in time, the upper courses were laid with rubble.³⁶

The base of the foundation above ground was described as "the fustum of an octagonal pyramid with plinth & cornice. The outside is of cut granite, backed by coursed rubble set in cement."³⁷

³⁵Description of "New structure at Body's Island" in National Archives, Record Group 26, Entry 66 (NC-31), "Lighthouse Site Files."

³⁶Description of "New structure at Body's Island." According to correspondence from Lighthouse Engineer Hains, plans had called for cut granite throughout the foundation but the supplier could not supply the needed amount in the time specified so rubble granite was used instead in order to keep work on schedule. Difficulties encountered in unloading the granite from schooners were solved by building a pier that could hold a derrick. Correspondence found in National Archives, Record Group 26, Entry 3.

³⁷Description of "New structure at Body's Island" in National Archives, Record Group 26, Entry 66.

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In late November 1871, the brick contractor had been instructed to begin shipment of bricks, and in March 1872, Walter Frazier, a bricklayer, joined the crew. Around this time, the bonding of the brick was changed to reflect that used at Cape Hatteras.

In regard to your question as to the kind of bond to be used in the brick masonry of Body's Island Tower. I have decided to use the same bond as was used at Hatteras & for this purpose I will have long and short brick made at once to be used as headers. I expect also to use a better class of brick on the face than inside, in other words will follow exactly the course pursued in regard to Hatteras, and have it laid the same way.³⁸

On March 19, 1872, Engineer Hains sent the following instructions to Supt. of Construction Stetson regarding the brickwork for the tower:

Inclosed please find elevation and plans of the bond for the brick work of Lighthouse at Bodie's Island, N.C. You will lay aside the plans you received some time ago and use the inclosed set, the 1st and 2nd courses are to be stretchers, the 3rd a long header course with the 4th and 5th stretcher courses, and the 6th a short header course, this arrangement of bond will be observed throughout the construction of the tower.³⁹

The metalwork was provided by the West Point Foundry in Cold Spring, New York. It appears they used components manufactured by the Phoenix Iron Works in Philadelphia. The iron sections would have been pre-assembled at the plant and inspected before being disassembled and shipped south. Engineer Hains wrote Messrs. Paulding, Kemble & Co., on December 1, 1871 that he intended to see the pre-assembled work firsthand.

Yours of 29th ult. is received. I will come up myself and inspect the ironwork for Body's Island. Let me know when it is set up—you know I want to see it fitted together and set up. I shall want the balance of the ironwork in less than two months. I shall also require that for St. Augustine about the same time.⁴⁰

In January 1872, Capt. A.J. Fenton received instructions to transport the ironwork from Norfolk, Virginia, to Bodie Island on the Lighthouse Tender TULIP.

³⁸Correspondence dated September 16, 1871, from L.H. Engineer Peter Hains to Supt. of Construction Dexter Stetson; found in National Archives, Record Group 26, Entry 3.

³⁹National Archives, Record Group 26, Entry 3.

⁴⁰National Archives, Record Group 26, Entry 3.

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On March 11, 1872, Engineer Hains wrote to Engineering Secretary George Elliot,

Have you any particular plan for keepers dwelling at Body's Island N.C.? I would suggest that as it is extremely expensive to make repairs in this locality it would be advisable to build the dwelling of permanent materials—such as brick. This would also offer additional safety against fire.

I am having a tracing made for First Order Lighthouses from Plate 85-V, VI and VII—Volume of Drawings published by Light-House Board.⁴¹

The board agreed that a brick dwelling was suitable and approved several modifications to the standard plans, including the number of and placement of doors and windows. It was suggested by Engineer Hains that the doors and windows should be "made on the spot" rather than transported from Baltimore.

Work on the keepers' dwelling was initiated in early May and suspended in June so that the crew could concentrate on completing the tower. In July the engineer requested that the lens be ordered for the light and that a complete outfit for a first-order fixed light be shipped from the General Lighthouse Depot in Staten Island, New York.

On September 30, 1872, Engineer Hains reported to Major Elliot:

I have to report that I have just returned from a visit to Body's Island made chiefly with the view of passing off the men. Work is progressing satisfactorily. The lantern is finished, the lens up and if the lamp is in order the light can be and will be exhibited on the first of next month. The black and white bands show well and the tower will undoubtedly make an excellent daymark for coasters. The scaffolding was taken down the first of the present week. The keepers dwelling is well nigh completed also. I propose to fence in about 300 feet square of the light house lot. It is not deemed advisable or necessary to fence in the whole fifteen acres. The corners of the track are marked by large granite posts. . . .⁴²

The light was first exhibited on October 1, 1872, as anticipated in the "Notice to Mariners" that had been issued previously on July 13, 1872:

Lighthouse on Body's Island, between Cape Hatteras and Cape Henry.

⁴¹National Archives, Record Group 26, Entry 3.

⁴²National Archives, Record Group, 26, Entry 3.

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Notice is hereby given that the light house at Body's Island, on the seacoast of North Carolina, has been rebuilt and the light will be exhibited on or about the 1st of October, 1872, and every night thereafter, from sunset to sunrise.

It is situated north of Oregon Inlet, one and a half nautical miles, and is about two and a half nautical miles northerly of the site of the former light-house, which was destroyed during the late war. It is three-quarters of a mile from the Atlantic, and three-eighths of a mile from Roanoke Sound. The tower is of brick, is conical in form, and is placed on an octagonal pyramid of granite.

The focal plane is 150 feet above the ground, and 156 feet above the sea.

The lens is dioptric, of the first order of the system of Fresnel lens, and will show a fixed white light, illuminating the entire horizon, and can be seen from the deck of a vessel, fifteen feet above the sea, at a distance of eighteen and half nautical miles.

The light will also illuminate the waters of the Sounds of North Carolina, within the same distance.

The dome of the lantern, the railing, brackets of the gallery, and all the iron-work at the top of the tower, will be painted black. The tower will be painted in zones or belts, alternately white and black, each zone being about twenty-two feet in height. The upper zone will be white.

The keeper's dwelling, two stories high, is of brick, has the usual out-buildings, and is placed to the westward of the tower.

These buildings will be painted white.

The geographical position of this light-house, as shown by the United States Coast Survey, is as follows: Latitude 35° 49' 18" North, Longitude 75° 33' 27" West.

Cape Hatteras light bears due south, thirty-five nautical miles.

Cape Henry light-house bears N. by W. ½ W., seventy nautical miles.

Bearings are magnetic. Variation 2° 30' W., (1870.)

*By Order of the Light-House Board: Joseph Henry, Chairman.*⁴³

The 1872 light tower, dwelling, and other structures at the station were expensive to construct, costing more than five times as much as the previous station. It took three Congressional appropriations totaling \$140,000 to complete the station.⁴⁴ The first appropriation on July 15, 1870, specified \$60,000 "for building a light-house at Paul Gamiels Hill or at or near Bodies Island, about midway

⁴³Office of the Light-House Board, Treasury Department, *Notice to Mariners* No. 65. (Washington, July 13, 1872); found in National Archives, Record Group 26, Entry 5 (A-1), "Lighthouse Service Publications, 1838 - 1942."

⁴⁴Light-House Board, *Annual Report, 1873* (Washington, 1873), p. 47; Clipping File, Body's Island, N.C., National Archives; found in Holland, p. 42.

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between Cape Henry and Cape Hatteras."⁴⁵ The second appropriation on March 3, 1871 specified \$65,000 "for completing the first-class light-house on Bodie's Island, sea-coast of North Carolina."⁴⁶ The final appropriation on June 10, 1872 specified \$15,000 "for completing the light-house tower and buildings at Bodie's Island, North Carolina."⁴⁷

Shortly after completion of the station, the Light-House Board began advertising for bids to acquire the old lighthouse site across Oregon Inlet. A bid of \$65 was accepted from John Wescott & Co. of Manteo, and the deed was made out to John Wescott and W.D. Chaddic.⁴⁸

7. Operational History of the Current Light Station

The first-order lens, which had been purchased from Barbier & Fenestre of Paris, France, exhibited a fixed white light that could be seen for over 18 miles. A wire screen was installed to protect the lantern glass soon after a flock of geese smashed into the lantern on October 19, 1872, destroying three panes of lantern glass and damaging the lens. The screen was described by the District Engineer:

Pieces of No. 10 wire of proper lengths are attached to the iron-rod that encircles the upper portion of the lantern just under the cornice, passed down and over the handrail and made fast to the lower stringer. They are about (4) four inches apart at the bottom and gradually converge toward the top. After the inclined wires are made fast, fine thread wire is used to tie and hold them in position—the thread wire being about eighteen inches apart.⁴⁹

In December 1877, the District Engineer inspected the tower and found cracks on the second to seventh landings. "The cracks on the inside of the tower," he said, "are vertical and very slight—in but a few places large enough to admit the point of a small knife blade—usually very small, traceable only by a slight crack in the coating of the whitewash." He felt the cracks were due to lightning rather than irregular settling. The lightning conductor at this time was the interior metal spiral stairway connected to the metal work of the lantern at the top, and to a copper rod inserted in the ground near the center of

⁴⁵National Archives, Record Group 26, Entry 66.

⁴⁶National Archives, Record Group 26, Entry 66.

⁴⁷National Archives, Record Group 26, Entry 66.

⁴⁸Peter Hains to George H. Elliot, Dec. 5, 1872, Jan. 11, Jan. 16, Feb. 11, 1873, 5th Dist. Engineer Letter Press, Nov. 1872 to Feb. 1873; Hains to Messrs. Wescott & Chaddic, May 16, 1873; John W. Cathcart to John Wescott & Co., Feb. 6, 1873, 5th Dist. Engineer Letter Press, Feb. - May, 1873, Record Group 26; found in Holland, p. 42.

⁴⁹Peter Hains to George H. Elliot, March 14, 1873, 5th Dist. Engineer Letter Press, Feb. - May 1873; Holland, p. 44.

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the tower. During storms the stairway became heavily charged with lightning. A witness to this fact was the lighthouse keeper who, standing on one of the landings during a storm, received a severe shock, "so much so as to produce a numbness for some little time through the lower half of his body." As an alternative, the engineer suggested running a vertical rod from the lantern down the center of the tower to the ground where it would be connected to the copper grounding rod then in use. The rod was to be insulated where it passed through the eye that protruded from each of the landings. The Light-House Board considered the recommendation, but took no action until seven years later when lightning struck the tower again in April 1884. After this incident, the Light-House Board ordered the installation of a cable inside the tower which would run from the lantern to a cast-iron plate buried in the ground. The cable was to be connected at each landing in the tower.⁵⁰ It is not known when the current exterior lightning cable was installed.

In 1898 a telephone was installed as part of a national defense program.

For many years the U.S. Signal Service had telephone lines connecting the various Life Saving Stations on the Outer Banks, these lines fed into a central location. The War Department decided to broaden their coverage and used their funds to tie five lighthouses on the North Carolina and Virginia coasts into the lines connecting the Life Saving Stations. The light stations affected were those at Hog Island, Virginia; Bodie Island, Cape Lookout, Currituck Beach and Cape Hatteras. Any untoward activity off the coast was to be reported immediately.⁵¹

In 1874 the Light-House Board abolished the position of third assistant keeper, then held by the wife of the keeper. In 1922, the Lighthouse Bureau did away with the position of second assistant and increased the salary of the remaining keepers.⁵² The last keeper, L. V. Gaskill transferred to another station in 1940 when the light at Bodie Island was automated. No longer needing the daily attendance of a keeper, the light became the responsibility of the Coast Guard at the nearby Nags Head Lifeboat Station.⁵³

⁵⁰O.E. Babcock to Joseph Henry, Dec. 10, 1877, 5th Dist. Engineer Letter Press, Feb. 1877 to Feb. 1878; O.E. Babcock to Chairman, U.S. Light-House Board, April 29, 1884, 5th Dist. Engineer Letter Press, Jan.-Jun. 1884; Meeting of May 6, 1884, Light-House Board Journal, May 6, 1884 to May 5, 1886; Holland, p. 43.

⁵¹W.A. Jones to Light-House Board, April 11, May 30, 1898, 5th Dist. Engineer Letter Press, Jan.-Aug. 1898; Light-House Board, *Annual Report, 1898* (Washington, 1898), p. 108.; found in Holland, pp. 46-47.

⁵²Memo from Superintendent of Lighthouses H.D. King, dated July 11, 1922; found in the files at Cape Hatteras National Seashore Headquarters, Manteo, N.C.

⁵³Lloyd V. Gaskill papers; found in *Historic Structures Report: Bodie Island Lighthouse, Cape Hatteras National Seashore, Manteo, North Carolina*, p. 21.

8. *Bodie Island Light Station and the Cape Hatteras National Seashore*

The Cape Hatteras National Seashore was established in 1937, encompassing the land surrounding Bodie Island Light Station. Soon after, the Department of the Interior approached the U.S. Lighthouse Bureau about the possibility of the light station being declared surplus. Change in administration of the Lighthouse Service to the U.S. Coast Guard in 1939 and World War II delayed any action. In January 1945, the size of the Bodie Island Light Station was increased by 40 acres. In 1953 the Coast Guard declared 56.37 acres of the Bodie Island Light Station excess to their needs and shortly afterwards the General Services Administration (GSA) listed it for disposal. The National Park Service asked GSA to withdraw the acreage from the disposal list since the land was within the boundaries of the Cape Hatteras National Seashore. GSA complied and paperwork was initiated to turn the land over to the National Park Service, effective October 15, 1953. The National Park Service acquired all but a small square plot of ground, 100' on each side, on which the light tower stood.⁵⁴ That same year, commercial power replaced the generator that had been installed to electrify the light in 1932.

The National Park Service converted the keepers' dwelling into a visitor center and small natural history museum. The tower was closed to the public while the Coast Guard continued to maintain it as an active aid to navigation. In May 1983, the National Park Service began to interpret the station. In May 1984, the Coast Guard installed an 8-foot-high chain-link security fence at the base of the staircase to discourage the general public from climbing the stairs. As part of the 200th-anniversary celebration of the commemoration of the establishment of the U.S. Lighthouse Service, visitors were allowed to climb the tower during one weekend in August 1988. Interpretation was expanded when the Outer Banks Lighthouse Society (OBLHS) established a presence at the station in 1994. OBLHS volunteers opened the lower portion of the lighthouse tower and offered interpretation of the light station and its history.

On July 13, 2000, the tower at Bodie Island was officially transferred from the U.S. Coast Guard to the National Park Service. As of the writing of this report in 2002, a \$1.5 million restoration of the tower is being planned.

9. *Lenses and Illuminants*

⁵⁴Merlin O'Neill to Director, National Park Service, Washington, April 1, 1953; Frank V. Lanham, "Notice of Availability of Excess Real Property," GSA, dated June 23, 1953; Conrad Wirth to Frank V. Lanham, Washington, July 3, 1953; Hillory Tolson to Frank V. Lanham, Washington, July 14, 1953; Charles A. Rickey to Frank V. Lanham, Washington, Oct. 1, 1953; Frank V. Lanham to Hillory A. Tolson, Atlanta, Oct. 1, 1953; R.E. Wood to Director, National Park Service, Norfolk, Oct. 13, 1953; all in Cape Hatteras, 1953, file, Office of Land and Water Rights, National Park Service. Coast Guard Drawing No. ND - 1599, dated Oct. 1, 1952, in files of the 5th Coast Guard District Headquarters, Norfolk, Virginia; found in Holland, pp. 50-51.

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The character-defining feature of a lighthouse is the light. In essence the tower serves as a platform for supporting a light during dark or inclement weather. During the daylight hours the tower also serves as a daymark, which is indicated by distinctive coloring, markings, or shape.⁵⁵ The lighthouse at Bodie Island is significant because it retains its historic optic, a first-order Fresnel lens.

The earliest lights were open fires fueled by wood. Later pitch and coal were burned in huge vats and grates. In an effort to get a more manageable light and a less dangerous one, candles were introduced. Oil lamps, too, were used over the years, but they gave off smoke, coating the interior of the lantern panes. A major breakthrough came in 1782 when Ami Argand developed "an oil lamp that smoked little, but at the same time gave a steady flame with a more intense light than previous lamps." What made Argand's lamp unique were "two vertical concentric tubes of thin brass, [the larger one being] about 1" in diameter and separated slightly, the space between them holding a cylindrical cotton wick. Air passed upwards through the inner tube as well as outside the outer tube and this double air current playing on both sides of the lighted wick ensured an even temperature and good combustion of the oil." An additional feature that assisted burning and thus gave a brighter light "was a circular glass chimney closely surrounding the outer tube and the wick."⁵⁶

Until the 1850s, nearly every lighthouse in the United States used a type of Argand lamp with parabolic reflectors patented by Winslow Lewis. These lamps were placed side by side around the circumference of a circle, and the number of lamps used depended upon the arc of the horizon it was desired to illuminate. For years each lamp held a bulls-eye magnifying lens, but these lenses were practically useless, and in 1840, they were removed, leaving only the parabolic reflectors. Although inexpensive, Argand lamps used a vast amount of oil, required constant attention, and produced relatively little light.⁵⁷

A new lens apparatus was developed by Augustin Fresnel, a French physicist, in 1822. It was based on the dioptric or refracting principle; the old system being a catoptric, or reflecting system. Most dioptric systems also use some principle of reflecting; consequently, they are called catadioptric

⁵⁵In the Outer Banks, each tower has a unique daymark: Currituck is left natural, Bodie Island has horizontal black and white bands, Cape Hatteras has black and white spirals, Ocracoke is completely white, and Cape Lookout has black and white diamonds.

⁵⁶D. Alan Stevenson, *The World's Lighthouses Before 1820* (London, 1959), pp. 61-62; found in Holland, p. 9.

⁵⁷John S. Conway, *The United States Lighthouse Service* (Washington, 1923), pp. 29-30; Arnold B. Johnson, *The Modern Lighthouse Service* (Washington, 1890) p. 50; found in Holland, pp. 9-10.

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systems.⁵⁸ The Fresnel lens is like a glass barrel whose outer surface is made up of prisms and bullseyes. In a revolving or flashing light, the bullseyes are surrounded by curved, concentric prisms, concentrating the light of a central lamp into several individual beams, radiating out like the spokes of a wheel. In the fixed, or steady light, such as was used in the last Bodie Lighthouse, the bullseyes become a continuous 'lens belt', with the prisms parallel to it, producing an uninterrupted, horizontal sheet of light.⁵⁹ Fresnel lenses were classified into seven orders, determined by the focal distance, which is the distance from the flame to the lens.⁶⁰ The first order was the largest and was used primarily in coastal lights that needed to be seen at a great distance out to sea.

The United States was slow to adopt the Fresnel lens and for years a debate was carried on in this country over the merits of the old and new systems. Finally, in 1841 the United States purchased its first Fresnel lenses and tested them in the twin towers at Navesink Light Station at the entrance to New York Harbor in New Jersey. The new lenses were applauded by sea captains; however, ten years later there were just two light stations in the country with Fresnel lenses.

Finally in 1851, complaints regarding the country's inferior system of aids to navigation grew so intense that Congress ordered a sweeping investigation of the country's aids to navigation, and appointed what would today be called a 'blue ribbon panel' to conduct the investigation. The panel consisted of distinguished military officers and civilian scientists. Their investigation was broad and thorough, not only analyzing and criticizing the current state of aids to navigation, but also offering detailed recommendations to cure the problems. Surveys of ship's captains who sailed up and down the coasts were conducted. All findings were compiled into a report that made specific recommendations for improvements.⁶¹

In 1852 Congress passed legislation to establish the U.S. Light-House Board, which was essentially composed of those who had overseen the earlier investigation. The appointment of these experienced, knowledgeable men to the Light-House Board attracted others of similar quality to lighthouse duty, both on the board and in district offices. The country was organized into twelve lighthouse districts, each having an inspector (a naval officer) who was charged with building the lighthouses and seeing that they remained in good condition and that the lens was operational. After a few years the inspectors became overloaded with work and an engineer (an army officer) was appointed to each district to tend

⁵⁸Conway, p. 30; found in Holland, p. 10.

⁵⁹Holland, p. 10.

⁶⁰Conway, p. 30; found in Holland, p. 10-11. For the orders of the Fresnel lenses, see Appendix A.

⁶¹"Administrative History of the Lighthouse Service," National Park Service web site
<www.cr.nps.gov/maritime/light/admin.htm>.

to the construction and maintenance of lighthouses.⁶²

The Light-House Board moved quickly in applying new technology, particularly in purchasing and installing new Fresnel lenses. On March 3, 1851, Congress had approved an appropriation bill that included permission for the Secretary of the Treasury to place Fresnel lenses in new lighthouses, in lighthouses not having lenses, and in lighthouses requiring a new illuminating apparatus. After its investigation the board reported that "the Fresnel lens is greatly superior to any other mode of lighthouse illumination, and in point of economy is nearly four times as advantageous as the best system of reflectors and Argand lamps." In May 1852 the first chairman of the Light-House Board said that the "[Fresnel] Lens in useful effect, brilliancy and economy is superior in its different orders to any combination, number and size of the best parabolic reflectors."⁶³ By the Civil War, most lighthouses had Fresnel lenses. Despite the higher initial cost of the system, the Fresnel lenses paid for themselves within a few years, due principally to the savings in oil.

An additional, and perhaps more important benefit, was that with the Fresnel equipment it was next to impossible for the lighthouse keeper to make a mistake. As one historian has succinctly summed it up, "the adoption in this country of the [Fresnel] Lenticular apparatus made it possible for a light keeper of average capacity to keep a good light, and impossible for him to keep a bad one, unless by violation of plain rules and avoidance of routine duties."⁶⁴

Argand lamps burned sperm or whale oil. A number of lamps were required in that system whereas a Fresnel lens required only one lamp in the center of the lens. Sperm oil was initially used in the lamps for Fresnel lenses. In the early 1840s, sperm oil was 55 cents per gallon. Soon afterwards, however, the supply of sperm oil began to diminish, and at the same time the use of sperm for manufacturing purposes increased. The result was a steady rise in price. In 1854 sperm oil brought \$1.38 per gallon, and by 1863 it cost \$2.43 a gallon. The Light-House Board, concerned about this increase, soon began to look for a substitute fuel. They turned first to colza, or rapeseed, oil. Subsequent tests revealed that colza oil was ideally suited for lighthouse purposes; it was as good as sperm and cost only half the price. By the late 1850s colza oil was being introduced in United States lighthouses. In 1861 the Light-House Board purchased 5,000 gallons, and in 1862, 12,000 gallons. The amount of wild cabbage that produced the oil, however, was insufficient to supply the needs of the Light-House Board. The board at first had thought that by creating a market they would encourage the farmers to grow more wild cabbage. The farmers continued to grow only enough to provide for domestic use, and, as

⁶²"Administrative History of the Lighthouse Service."

⁶³Holland, pp. 11-12.

⁶⁴Johnson, p. 50; found in Holland, p. 13.

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the Light-House Board lamented "by no means enough for general adoption in the Lighthouse Service."⁶⁵

Meanwhile, experiments were being conducted with lard oil. Professor Joseph Henry, who was Chairman of the Committee on Experiments, reported it to be highly satisfactory in the Fresnel lamp and in the Franklin lamp "in which the combustion is carried on at a high temperature...." Moreover, lard oil yielded more light than sperm oil. Tests had been run on lard oil before, but as a fuel it was found unsatisfactory because the first experiments, as Professor Henry later found, had used too low a combustion rate. As a result of Henry's report lard oil was soon introduced in lighthouses, and by 1867 it had supplanted sperm oil as the principal illuminant. Colza oil continued to be used in smaller lamps.⁶⁶

In the 1870s experiments were conducted on kerosene, or 'mineral oil', as it was more popularly known then. It was found satisfactory and began to replace lard oil in 1880. By 1885, kerosene was in general use in lighthouses. In 1880 the Lighthouse Service purchased 48,000 gallons of mineral oil. Nine years later the annual purchase totaled over 330,000 gallons as compared with 16,000 gallons of lard oil in the same year.⁶⁷

In 1904 the incandescent oil vapor lamp was first introduced in a United States lighthouse. "In this lamp the kerosene, forced into the vaporizer by air pressure, is heated and vaporized, and is burned mixed with air under a mantle, which is thus brought to a brilliant incandescence," said George Putnam, Commissioner of Lighthouses. "This lamp," he added "gives a much more powerful light than the wick lamp, with a smaller consumption of oil, and has been greatly appreciated by mariners because of its superior brilliancy."⁶⁸

Experiments in using electricity to light aids to navigation began around New York Harbor in the 1880s, but electricity was not widely adopted until the 1920s. Soon it would change the nature of lighthouse keeping, allowing for automation and decreasing the dependence on keepers.

⁶⁵Secretary of the Treasury, *Report on the State of the Finances, 1853-54* (Washington, 1854), p. 295; *Report on the State of the Finances, 1868* (Washington, 1868), p. 309; Washington A. Bartlett to William L. Hodge, Paris, France, Dec. 13, 1852, National Archives; Johnson, p. 54; George Putnam, *Lighthouses and Lightships of the United States* (Boston: Houghton Mifflin Company, 1917, revised edition 1933), p. 185; found in Holland, p. 14.

⁶⁶Secretary of the Treasury, *Report on the State of the Finances, 1864* (Washington, 1864), p. 173; *Report on the State of the Finances, 1867* (Washington, 1868), p. 194; Putnam, pp. 185-186.

⁶⁷Johnson, p. 55; Putnam, p. 186

⁶⁸Putnam, p. 187.

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At Bodie Island, sperm or whale oil would have been used in the first tower. As sperm oil became too expensive, it was replaced with lard oil. In 1883, mineral oil replaced lard oil, and in 1884, regular mineral oil lamps were installed. In 1896, a sheet metal oil house was constructed to house the highly flammable mineral or kerosene oil.⁶⁹ In 1909, a 5-wick, "Funck" float lamp was used.⁷⁰ An incandescent oil vapor lamp was introduced in 1912, increasing the candlepower from 10,000 to 57,000. In 1915, the candlepower was reduced to 22,000. In 1932 the power source was converted to electricity and a generator was installed in the oil room. The new incandescent lamp produced a candlepower of 160,000 permitting an occulting characteristic, which meant the light was on for 2.5 seconds, off for 2.5 seconds, on again for 2.5 seconds, and then off for 22.5 seconds. (A characteristic that continues to this day.) In 1941 the candlepower was once again reduced, this time to 13,000.⁷¹ In 2002 an electrified modern lamp is used to illuminate the original Fresnel lens.

PART II. ARCHITECTURAL INFORMATION⁷²

A. General Statement:

1. *Architectural character:* Lighthouses reflect a variety of architectural styles and construction types that were influenced by politics, need, cost, location, and geography of the site, as well as technology available at the time of construction. Bodie Island Light Station reflects a common onshore construction type—the stand-alone conical brick tower. The station also belongs to a subcategory of tall brick towers, over 150' in height, of which only about a dozen were constructed.

2. *Condition of the fabric:* At ground level, the exterior of the tower looks remarkably sound; however, significant repair and replacement of the ironwork of the interior stairs and components of the

⁶⁹Holland, p. 46.

⁷⁰"Description of Buildings, Premises, Equipment, at Bodie Island Light Station, Seacoast of North Carolina."

⁷¹Subject Index Cards, Lighthouse Correspondence, 1852-1899, Bodie Island, Dec. 26, 1883; Subject Index Cards, Lighthouse Correspondence, 1910-1938, Bodie Island, Sept. 11, 1911, April 8, 1932; Light-House Board Meeting of Jan. 16, 1889, Light-House Board Journal, Jan. 2, 1889 to June 2, 1890; Wm. Chalmers to Department of Commerce, Norfolk, July 23, 1925; Lighthouse Correspondence, 1923; G.R. Putnam to Wm. Chalmers, Aug. 7, 1925, Lighthouse Correspondence, 1925. U.S. Light-House Board *Light List*, 1873 (Washington: G.P.O., 1873); *Light List*, 1886, pp. 52-53; *Light List*, 1882, pp. 46-47; *Light List*, 1898; *Light List*, 1912; *Light List*, 1915; *Light List*, 1933; *Light List*, 1941; *Light List*, 1963, p. 344; Holland, p. 49. On page 46, Holland indicates mineral oil was first used in 1884.

⁷²Much of this information is based on a site visit by Candace Clifford and Todd Croteau on April 18, 2002, and the April 2002 draft of the *Historic Structure Report* prepared by Harttrampf and OJP Architects, Atlanta, Georgia.

lantern is needed.⁷³ Planning for a complete restoration was underway in 2002. The scope of work included providing access to the oil house; repainting the tower interior; rehabbing the electrical system; replacing or restoring windows; lead paint abatement; repairing masonry; replacing or repairing stair treads and associated components; repairing and replacing metal components of the lantern; repairing wooden floor and roof framing in the oil house; replacing copper roof flashing on the oil house; repainting tower exterior; providing lightning protection; restoring or replacing wooden doors; and repairing marble flooring.⁷⁴

B. Description of the Exterior

1. *Overall dimensions:* The overall dimensions from the bottom of the foundation to the top of the ventilator ball is 164.4'. The focal plane, the distance between the center of the lens to the mean high water mark, is 156'. The tower is 150' from the surface of the ground to the focal plane. The diameter at the top of the granite foundation is 28' and the diameter at the parapet of the lantern is 16'-8". About 11' of the granite base of the tower is above ground.⁷⁵

2. *Foundation:* The granite foundation, an octagonal pyramid, rests on a timber grillage system. The above ground foundation is octagonal with one of the eight sides opening into the passageway between the tower and the attached oil house/workroom. Above ground, the foundation is made up of five courses of cut granite blocks; the first three courses consist of blocks with a rough or split-faced finish with a cut band around each face. The top two courses that form the belt course, or cap, consist of blocks with a smooth face. The granite courses are filled with rubble stone set in cement. An interior brick column supports the floor at the base of the tower.

The foundation of the oil house/workroom is masonry with a crawl space. A granite belt course lines the perimeter.

3. *Walls:* The tower's brick shaft tapers from 6 bricks thick at the base to 2 1/2 bricks at the top. There is an interior and exterior wall connected by brick sections similar to the spokes in a wheel so that small hollow sections are created between the inner and outer walls—a design attribute common to many masonry lighthouse towers. The hollow sections served several functions. The air in the voids acted to keep the interior of the tower warmer in the winter and cooler in the summer as well as

⁷³International Chimney Corporation estimated that \$1.4 million in repairs were needed. *Historic Structures Report*, p. 9.

⁷⁴"Project Funding Component Data Sheet: 59651A" on file at Cape Hatteras National Seashore.

⁷⁵Dimensions based on a drawing found in the files at Cape Hatteras National Seashore and "Description of Buildings, Premises, Equipment, at Bodie Island Light-Station, Seacoast of North Carolina"; also found in park files.

lessening condensation on the inner walls. The voids allowed for a less massive structure overall, so that the tower could be built on ground that would ordinarily not be able to support a heavier structure. Less bricks were required as a result, bringing down the cost of construction.⁷⁶ The hollow sections also probably provided the tower with more flexibility to shift in changing temperatures and ground conditions.

The walls were coated with a cement wash and painted with alternating black and white horizontal stripes as its distinctive daymark. Three white and two black stripes each measure 22'.

The attached passageway and oil house/workroom are also brick with a granite belt course and are painted white. The oil house/workroom and adjoining passageway has a wooden roof sheathed in asphalt shingles.

5. Openings

a. *Doorways and doors:* The entrance is at the front of the oil house/workroom. The front stoop, located on the west elevation has a Stick style, cantilevered gabled overhang supported by three brackets. Four granite steps and sill lead up to a wooden door, which is not original. Over the door is a transom light of three-over-three panes. Above the door, '1871' is carved in granite.

The metalwork specifications indicate that the watch room vestibule with its two wooden doors would "prevent injurious draughts of air from reaching the lantern from the stairs and through the parapet doorway."⁷⁷

b. *Windows:* There are nine windows in the shaft section of the Bodie Island Lighthouse. Each window has a granite casing. Five windows are located in the shaft section and four directly under the lantern in the service room.⁷⁸ Two windows are located in the black stripes and face west towards the keepers' dwelling, and three windows are located in the white stripes and face east. All five windows are surrounded with granite and topped with pedimental hoods. The four windows located in the service room face north, south, east and west. All nine windows are casement-type opening out.

⁷⁶Wayne Wheeler, "The 1870 Tower Design," *The Keeper's Log*, Summer 1998, p. 14.

⁷⁷Metalwork specifications, p. 27.

⁷⁸For the purpose of this history, the room below the lens is referred to as the watch room and the room below the watch room is called the service room, following the terminology in the drawings. Some sources indicate the reverse terminology, the service room being the area below the lens and the watch room below the service room, which makes sense in that there would be windows in the watch room for the keeper to observe weather conditions and ship traffic and the service room would be more accessible to the lens area.

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Those in the shaft are wood frame with granite sills and cast-iron sill guards. The service room windows are also wood frame with cast-iron headers, sills, and jams.

There are two four-over-six pane windows in the passageway between the tower and the oil house/workroom. There are two four-over-six pane windows in the oil room section (south elevation) and two four-over-six pane windows in the workroom section (north elevation). All are wooden double-hung sash windows mounted in wood frames and casing. They all have cast-iron sills and a granite arch. Although shutters are indicated on the original drawings of the oil house/workroom and appear in original drawings and the 1893 photographs, none survive.

c. *Chimneys*: Two chimneys extend from the roof of the oil house/workroom; one for each fireplace on the north and south elevations. The chimneys are brick with a granite cap and detail.

7. *Lantern*: The tower is topped with a cast-iron polygonal (sixteen-sided) lantern which houses a first-order Fresnel lens. "The principal parts are the inner and outer galleries forming the base, the metal framing of posts and sash bars for the plate glass, the iron cornice, and the pyramidal roof and ventilator of copper."⁷⁹

Three rows of glass panes, sixteen per row, surround the lens, separated by vertical wrought iron posts finished with bronze and horizontal bronze sash bars. The lantern panes are $3/8"$ thick. The top row of panes are $44\ 5/8" \times 27\ 7/8"$; the middle row is $39" \times 27\ 7/8"$; and the bottom row is $30\ 3/4" \times 27\ 7/8"$.⁸⁰ Eight bronze air vents are located at the bottom of every other pane.

The lantern is capped with a copper-sheet roof and copper ventilator ball surmounted by a bronze pinnacle with a platinum tip. The roof is lined with sheet zinc. Below the roof, a tin hood protects the lantern. Eight iron rods protrude from the roof and connect to an iron spider that secures the top of the lens.

The lantern has two decks. The lower deck, referred to as the 'watch room gallery' in the plans, consists of iron plates supported by sixteen cast iron brackets. There is an iron door to access the gallery deck from the watch room, which swings outward. The webbed "skid proof" iron gallery deck area is protected by an iron railing. Between the deck and the brackets, a rolled-iron cornice provides a decorative trim. Sixteen spanning plates are located between the brackets. The brackets are seated

⁷⁹"Specifications for the Lantern of a First-Order Light-House at Body's Island, North Carolina," p. 33; this section is taken from a larger U.S. Light-House Board publication whose title is not known.

⁸⁰Measurements found in "Description of Buildings, Premises, Equipment, Etc. at Bodie Island Light-Station, Seacoast of North Carolina."

on a brick ledge covered with cast iron, which is called a belt course. The upper deck, referred to as the 'lantern gallery' in the plans, is accessible from the lens area. This deck is also surrounded by a wrought-iron railing and a cornice below it. A wrought-iron ladder rail along the lantern gallery deck allowed the keeper to use a ladder in cleaning the exterior of the upper lantern panes and in replacing them when broken.

An exterior braided copper wire, running the length of the tower, serves as a lightning conductor.

C. Description of Interior:

1. *Interior plan:* One enters the tower through the front door of the attached oil room/workroom. A hallway leads past an oil room on the right and a workroom on the left, and stops at another doorway opening into a passageway leading to the base of the tower. Eight granite steps lead up to a landing with four additional steps leading diagonally both to the right and to the left. A semi-circular wrought-iron pipe railing is located between the steps. Another circular pipe railing protects a well for clockwork weights, which were never used in this particular tower. Since the U.S. Light-House Board followed a standardized design used for all stand-alone conical first-order towers built during that period, the well for clockwork weights was still constructed, despite not being necessary. The well, 3'-7" in diameter, is in the center of the floor and is sunk 3' deep into the foundation and rounded by a cast-iron curb.

The interior diameter of the tower at its base is 16'-8" in diameter. The interior diameter of the tower diminishes to 10'-8 1/8" under the service-room floor or eighth landing.

Both the workroom and oil room have a fireplace. The oil room has two shelves for oil butts at either end. Each shelf has four semi-circular recesses at the back in which oil butts would have been stored.

2. *Stairways:* A cast-iron staircase leads from the base of the tower to the lantern, interrupted by eight cast-iron landings. A decorative cast-iron newel post sits at the foot of the staircase. The stairways are free floating, supported only by the landings, which in turn are supported by three brick courses—two singles and one double. The stairway follows the interior brick wall on the left and supports a 2" gas-pipe hand railing on the right. Each landing is also protected by an identical railing. The rods of all the railings are 6" apart. Each section of the stairway is a half spiral until the last landing. Between the last landing and the service room is a full spiral. The stairway from the service room to the watch room is a half spiral. A nine-step staircase leads up from the watch room to the lens area; there is no railing for this final stairway.

The stairways, landings, and all other iron components are painted black. According to the specifications:

All surfaces of iron-work shall be painted with two (2) coats of red lead in oil, thoroughly applied *at the workshop* and left to dry for some days before shipment. A third coat will be put on by the contractor when the structure shall have been completed at the site.⁸¹

The rise from step to step is uniformly 7 1/2"; however, the number of steps between each landing, aside from the final spiral, decreases as you climb the tower.

3. *Flooring*: The floor at the base of the tower is marble tile in a diamond checkerboard pattern. The oil room has a similar marble floor while the workroom has a wooden floor. The floors of both the hallway and passageway are also marble. Each landing within the tower is cast iron. The floor of the service room is cast iron, as is the floor of the watch room and lens area.

4. *Wall and ceiling finish*: The interior walls are brick painted white.

5. *Openings*: There is a wooden door leading from the oil house/workroom to a passageway leading into the tower. Above the arched entrance inside the tower a plaque is inscribed,

Body's Island Light House
Erected A.D. 1872
Latitude 35°-48'
Longitude 75°-33'

This plaque replaced an earlier plaque listing the members of the U.S. Light-House Board when the tower was constructed.

The doors leading into the workroom and oil room are pine, faux painted to look like oak.

6. *Mechanical Equipment*: The first-order lens was manufactured by Barbier and Fenestre, Paris, France, in 1871. The inside diameter of the lens is 6'- 9/16". Shaped like a beehive, eight panels form the central drum section. Above the drum are sixteen upper catadioptric panels consisting of eighteen prisms, and below are seven lower catadioptric panels consisting of eight prisms. The lens sits on an iron pedestal. When an oil or kerosene lamp was used, a 4" diameter iron tube would have connected

⁸¹U.S. Light-House Board, "Specifications for the Metal-Work of a First-Order Light-House to be Erected at Body's Island, North Carolina," p. 31.

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a damper tube at the top of lens to the bottom of the ventilator ball.⁸² Today a modern filament-type bulb is powered through an electric cable.

Directly under the lantern is the watch room in which spare lamps and supplies would have been stored. Seven glass portholes penetrate the floor of the lens room providing additional light into the watchroom.

D. Site:

1. *General setting and orientation:* Aside from shifting shorelines, the lighthouse is in the same setting as when built. In 1909, the station was 3/4 of a mile (3,960') from the Atlantic Ocean; today it is 2,900'.

2. *Historical setting and orientation:* Four granite stones mark the original boundaries of the light station, encompassing 15 acres. At one time a wooden fence enclosed 1.92 acres of the area surrounding the buildings. At ground level, the landscape retains its historic features and has not suffered any major intrusions.

3. *Support buildings:* Surviving historic support buildings include a duplex keepers' dwelling, a storage shed, and three brick cisterns. Non-historic structures include an air-conditioning unit, parking lot, wildlife observation tower, and a public restroom. Associated features include a non-historic wooden four-railed fence built around the tower to protect visitors from any debris that might fall off the tower. A brick walkway between the tower and the keepers' dwelling and between the keeper's dwelling and the access road is historic. The NPS installed a system of wooden walkways that are not historic.

The two-story brick duplex keepers' dwelling was intended to house the keepers and their families. Records indicate that many of the keepers families did not live on the station, which is not surprising given that at times there were three, and sometimes even four, keepers assigned to the station. One keeper indicated "that all were thrown too intimately in contact to maintain proper discipline and order."⁸³ Essentially the layout of each house mirrored the other, with the plan for each having five

⁸²"Description of Buildings, Premises, Equipment, Etc. at Bodie Island Light Station, Seacoast of North Carolina."

⁸³Correspondence from Lighthouse Inspector E.P. Wood to the Light House Board, Washington, D.C., dated August 29, 1899, found in the files at Cape Hatteras National Seashore Headquarters. Apparently the inspector recommended that a separate building be constructed to house the principal keeper but his suggestion was never carried out because no bids were received that fell within the appropriation.

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rooms. The overall dimensions were 28' x 48'. Originally constructed in 1872, a 1950 disposal memo indicates that the dwelling was altered in 1900, 1910, 1925, and 1934.⁸⁴

Rainwater was collected off the roofs of the keepers' dwelling through a gutter system and stored in three brick cisterns. The capacity of each cistern was 2,500 gallons. Two cisterns appear in the 1893 survey. In 1909, the number increased to three: one was located at the southeast end of the dwelling used by the principal keeper and two were located to the northwest and used by assistant keepers. All were fitted with water and dirtproof covers. Today, two of the cisterns are still connected to the dwelling's gutter system. What appears to be a fourth cistern on the principal keeper's side of the dwelling was built to support air conditioning units.

An 1893 survey indicates that there were storage buildings, a wood shed and two privies. "Description of Buildings, Premises, Equipment, at Bodie Island Light Station, Seacoast of North Carolina," completed March 6, 1909, indicates the presence of two storehouses, two water-closets (privies), a stable and chicken house. The privies were periodically rebuilt, with the last set dating from 1921, although none survive. Keeper Peter G. Gallop received permission to build a stable on the lighthouse premises on September 7, 1897.⁸⁵ Second Assistant Keeper F.E. Simpson requested permission to build a similar building in 1902, although a reply to his request is unavailable.⁸⁶

In 1909, the "Description of Buildings, Premises, Equipment, at Bodie Island Light Station, Seacoast of North Carolina," indicated that "two storerooms, constructed by keeper, one used by the keeper, 60 feet west of the dwelling; the other by assistants, 60 feet east of the dwelling" existed. According to John Gaskill, son of former keeper Vernon Gaskill, the storehouses were actually north and south of the dwelling. Later the storehouses were turned into garages, and after the war the storehouses were sold, moved, and made into cottages.⁸⁷ Gaskill also notes that the surviving storehouse was built in the 1920s, probably at the time a new oil house was built. According to Gaskill, "the storehouse contained all the necessary tools and equipment that the keepers needed to make minor repairs and maintenance. Large projects were left to the lighthouse working party. The building also stored the tackle to paint the

⁸⁴Memos dated February 1949 and March 3, 1950, from Commander of the Fifth Coast Guard District to the Coast Guard Commandant, regarding Disposal of Buildings at Bodie Island Light Station; found in National Archives Record Group 26, Entry 100, "Mixed Boards of Survey, 1939-1950."

⁸⁵Correspondence from the Lighthouse Engineer to Keeper Gallop dated September 7, 1897; found in files at Cape Hatteras National Seashore Headquarters.

⁸⁶Correspondence from Simpson to Engineer Jones dated October 3, 1902, in files at Cape Hatteras National Seashore Headquarters.

⁸⁷Personal communication from John Gaskill to Cheryl Roberts, forwarded to Candace Clifford on September 21, 2002.

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tower, paints, painting equipment, rope, etc. This is the building I remember where they mixed the paint."⁸⁸ The 1909 form also indicates that there was a one-acre garden, described as "unprofitable," perhaps because the ground cover is described as "marsh and sand."

In 1896 a sheet-metal oil house was built to store the kerosene.⁸⁹ The oil house, 10' x 16', was located 50' southeast of the tower. It could store 504 five-gallon cans.⁹⁰ When electricity replaced kerosene as the illuminant in 1932, the oil house became a generator building. In 1953 the source of electricity was switched from the generator to commercial power.⁹¹

A 1949 memo describes a wood shed built in 1930 as being frame with a concrete floor, 16' x 28'. It also mentions two one-story frame garages, 12' x 20', which were possibly converted from earlier buildings. The same memo states,

The Board finds that the buildings and land were retained by the Coast Guard and Navy during the war to provide additional barracks facilities; that the buildings are obsolete; that all structures are in poor condition, the wood shed being all torn down with exception of concrete floor; that the buildings are not now being used or maintained by the Coast Guard.⁹²

The board was also of "the opinion that the buildings are a fire hazard" and recommended that the brick keepers' dwelling be retained, but not the deteriorating frame-constructed buildings.

At one time a wooden board fence enclosed 1.92 acres of the station. It appears in the 1893 photographs and is listed in the 1909 "Description of Premises, Equipment, Etc." Wooden walkways connected the keepers' dwelling to all the outbuildings. The 1897 *Annual Report* indicates "some

⁸⁸Personal communication from John Gaskill to Cheryl Roberts, forwarded to Candace Clifford on September 21, 2002. Other sources indicate the sheet metal oil house was built in 1896; perhaps a second oil house replaced the 1896 one.

⁸⁹The *Historic Structures Report: Bodie Island Lighthouse, Cape Hatteras National Seashore, Manteo, North Carolina*, prepared by Hartrampf and OJP Architect, indicates kerosene was introduced in 1883; the 1896 *Annual Report* indicates that the metal oil house had been erected during the past year.

⁹⁰"Description of Buildings, Premises, Equipment, at Bodie Island Light-Station, Seacoast of North Carolina" (Department of Commerce and Labor, Light-House Establishment, Fifth District), completed by Major W.E. Craighill, Corps of Engineers, USA, Lighthouse Engineer, March 6, 1909.

⁹¹*Historic Structures Report: Bodie Island Lighthouse, Cape Hatteras National Seashore, Manteo, North Carolina*, report prepared by Hartrampf and OJP Architect (Atlanta, Georgia: April 2002 draft), p. 12.

⁹²Memo dated February 1949 on "Disposal of land and buildings at Bodie Island Light Station," from Joseph Greenspun; found in National Archives, Entry 100, "Mixed Boards of Survey, 1939-1950."

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2,200 square feet of new wooden walks were put down, and 360 square feet of old wooden walks were relaid." In 1925 the station acquired 1,380 linear feet of a wire and concrete post fence to enclose the station.

Transportation to and from the station would have been by boat. A landing was located about a 1/2 mile west of the station. In 1909, the Lighthouse Engineer described about half of the area between the landing and the station as being "low and very muddy, as it is covered with water at almost every flood tide," while "the other half is sandy, covered with coarse grass."⁹³

⁹³"Description of Buildings, Premises, Equipment, at Bodie Island Light-Station, Seacoast of North Carolina."

APPENDIX A

Orders of Fresnel lenses

<u>ORDER</u>	<u>FOCAL DISTANCE</u>		<u>OVERALL LENS SIZE</u>
	Millimeters	inches	Diameter
First	920	36.2	6 ft.
Second	700	27.6	4 ft. 6 in.
Third	500	19.7	3 ft. 2 in.
Three and 1/4	375	14.7	2 ft. 4 in.
Fourth	250	9.8	1 ft. 6 in.
Fifth	187.5	7.4	1 ft. 2 in.
Sixth	150	5.9	10 in.

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